AN EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF ABDOMINAL STRENGTHENING EXERCISES IN WORKING WOMEN FOLLOWING NORMAL DELIVERY

REGISTER NUMBER: 27091210

A DISSERTATION SUBMITTED TO
THE TAMILNADU Dr. M.G.R. MEDICAL UNIVERSITY
CHENNAI
IN PARTIAL FULFILLMENT FOR THE
REQUIREMENT OF THE DEGREE IN
MASTER OF PHYSIOTHERAPY

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CERTIFICATE

This is to certify that the project work entitled, "**AN EXPERIMENTAL STUDY TO ASSESS THE EFFECTIVENESS OF ABDOMINAL STRENGTHENING EXERCISES IN WORKING WOMEN FOLLOWING NORMAL DELIVERY",** was done by **R.Durga Devi** a bonafide student of Master of Physiotherapy under **THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY, CHENNAI.**

PROJECT GUIDE

(Dr. D. G. ANIMA, M.P.T. (OG.)
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ACKNOWLEDGEMENT

I first thank **LORD** and my parents for the confidence they have given throughout my life. I humbly acknowledge all the love and care showed by my parents throughout my life in making me what I am.

I respectively thank our correspondent **Prof.K.R.ARUMUGAM** for his support and guidance for the successful completion of my project. I wish to convey my sincere regards to **Principal Prof.R.SHANKER M.P.T. (O.G.).**

I gracefully recognize the valuable suggestions and guidance given by my guide, **Dr.D.G. ANIMA M.P.T. (O.G.),** Associate Professor. Ultra College.

I am indebted to all the faculty member of physiotherapy department.

Dr.B. RAMKUMAR M.P.T. (CARDIO)

Dr.J. SUDHARSAN M.P.T. (CARDIO)

Dr.M. ANANTHA RAJ B.P.T.

I also thank librarian **Mr.THIRUNAVUKKARASU** and other library staffs for extending cooperation in utilization of library.

I thank **Parkkavan hospital, trichy** for supporting the study. My heartful thanks to **my seniors** and **friends**.

CONTENTS

INTRODUCTION

Pregnancy is one of the miraculous and happiest moments in our life. It is a blessing from above and the joy that brings after all the pain of labour is unmatched. Living birth is the number one factor that brings about a big change to a women's body. They undergo many postural and biomechanical changes following labour. A number of women experience trouble bringing their abdomen back to its original shape and size after child birth.

After child birth the abdominal muscles are being stretched and elongated and sagging, the split between the two recti abdominal is called diastasis or divarication following labour. As a result the entire abdominal "corset" will be weakened with very little apparent mechanical support. In addition to this there will be increased elasticity of ligament and the back will be more vulnerable to injury resulting from incorrect use.

As a result of overstretched and weak abdominal muscle the patient experience difficulty in initiating micturition and inability to control bladder when she desires to void become apparent there is a leakage when the intraabdominal pressure is raised by coughing, sneezing and laughing. When she walks aware of an almost lack of abdominal control.

The abdominals are composed of several muscles the rectus abdominus, transverse abdominus, internal and external oblique muscles. Abdominal muscles sit on the front and sides of the lower half of the torso originating along the rib cage and attaching along the pelvis. Transverse abdominus muscle is the deepest muscle of the core, rectus abdominus muscle is commonly known as the six pack muscle. Internal and external oblique muscles run diagonally on the body allowing for angled movement. Rectus abdominus seen in crunching movement when the movement is reversed the rectus abdominus acts to bring the pelvis closer to the rib cage. The transverse abdominus act as a natural weight keeping your insides in. Internal and external oblique's muscles works to rotate the torso and stabilize the abdomen. These muscles are essential for trunk stability as well as keeping your waist tight.

Working mothers are prone to get these abdominals weakened due to lack of exercises and post labour relaxation. It is an important to regain the strength of their abdominal muscles after delivery. Strong abdominal muscles helps to prevent lower back injury and prevent abdominal organs from "dropping forward" due to lack of muscle support and help to regain a flat abdomen after child birth.

Work related injuries are traditionally seen in women those who are in physical work but as common in office settings especially in prolonged computer usage. Exercise is great stress reliever they must be provided even lesser time to get relaxation at work place. And also helps to avoid the risk of injury and other negative stuff.

So in my study I have selected the working mother group as the study population. The purpose of the study is to assess the effectiveness of abdominal muscle strengthening program for postnatal working mothers following normal delivery and also set up a postnatal exercise protocol to minimize such complications.

STATEMENT OF THE STUDY

An experimental study to assess the effectiveness of abdominal strengthening exercises in working women following normal delivery.

AIM OF THE STUDY

The aim of the study is to assess the effectiveness of abdominal strengthening exercises in working women following normal delivery.

NEED FOR THE STUDY

1. To create the awareness of abdominal muscle strengthening.
2. Explain the Importance of abdominal muscle training.
3. To improve the abdominal muscle strength.

OBJECTIVES

1. To assess the abdominal muscle strength in working women following normal delivery.
2. To evaluate the effectiveness of abdominal strengthening exercise in working women following normal delivery.
3. To determine changes after abdominal muscle training attending the programme in working women following normal delivery.

HYPOTHESIS

There is a significant change in abdominal strength in working women following normal delivery.

NULL HYPOTHESIS

There is no significant change in abdominal strength in working women following normal delivery.

OPERATIONAL DEFINITIONS

- Postnatal period – means the period after delivery.
- Abdominal Muscle training exercise - exercises that strengthen the abdominal muscles.
- Postnatal women – Women in the period few weeks after the delivery.

II. REVIEW OF LITERATURE

1. **Helene Byrne** (2006) suggests that abdominal strengthening exercise plays an important role in postnatal core conditioning programme.
2. **Alvin Eden** and **Elizabeth Eden** (2006) suggest that abdominal strengthening exercises are more valuable in postpartum period.
3. **Deena David** (2005) stretching and relaxation should be carried out after every workout in order to achieve all round fitness.
4. **Jessica Heller** (2005) the abdominal muscle strengthening helps to prevent the back from arching.
5. **Levinson** and **Debra** (2003) the abdominal crunches have been the standard abdominal exercise for tightening and structuring the abdominal muscles in postnatal period.
6. **Polden** and **white ford** (2002) suggest that strengthening exercise for abdominal wall muscles will be more effective in postnatal period.
7. **Filkins K** and **Kerr M** (2001) the technique of abdominal bracing exercise prior to and during any loaded exercise increase the functional activity.
8. **Kennedy** (2000) suggests specific activation of transverse abdominal and multifidus helps to improve spinal stability.

9. **Katrine Horsley** (1999) suggests strengthening, stability and toning exercises of abdominal muscles help to improve body awareness and it also emphasized through slow gently patterns and movements.
10. **BCFPND** (Brisbane Centre For Post Natal Disorder) (1996) found approximately 40-60 % of new mothers will experience some depression in postpartum similar to premenstrual tension and this is quite nominal bearing in mind the substantial immediate changes to the women's lifestyle. Physiotherapists have large educational role in postnatal period not only about physical condition but also the psychological status.
11. **Mc Hecken** (1994) found abdominal muscle exercises using contract relax techniques as an efficient pump mechanism to increase circulation.
12. **Bruckner** and **Kahn** (1994) suggest gentle exercises will improve the circulation to all major muscle groups and enhance neural and connective tissue function. This was theoretically decreasing the likelihood of injury.

13. **Ostgaard** and **Anderson** (1991) studied 817 women's with postpartum back pain,67% of the women experienced some back pain at the time of delivery, 37% of the women were still experiencing some back pain 18 months post-delivery. Of these women's 26% were greatly improved, 4% somewhat improved and 7% were still experiencing serious back pain. He suggests back pain is therefore a very significant condition and early treatment is recommended to avoid chronic pain situation.
14. **Abraham et.al** (1990) a preliminary prospective study looked at the recovery time after child birth. Early exercises leads to liberal blood supply to perineal area and episiotomy and laceration repairs have usually healed in 5-7 days.
15. **Sun din** (1989) found in postpartum period the lengthen muscle group which may have shortened in adaptation to pregnancy. He suggests physiotherapists emphasize the role of the release of tension for post natal period through such lengthening exercises.
16. **Mitchell** (1988) found a number of women would benefit from relaxation training in postnatal period. It may be useful both mother and baby in feeding time.

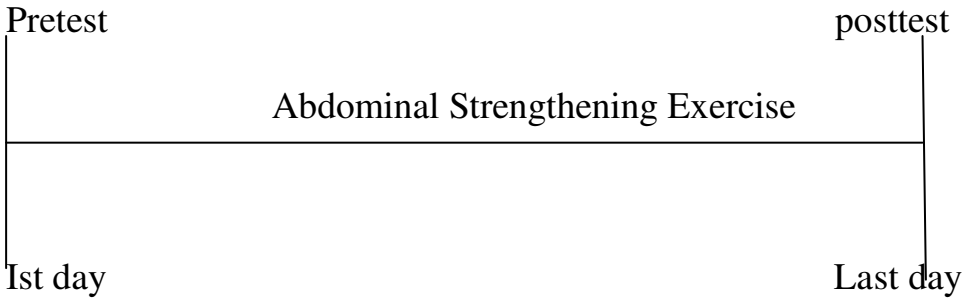
17. **Sale** (1988) found strength development of abdominal exercises in the first 6-8 weeks of training is due to more effective recruitment of motor units.
18. **Millard** (1987) gives good outline of urge control and bladder training. An abdominal muscle exercises can be helpful in preventing urgency.
19. **Gordon** and **Logue** (1985) found that subjects participating in regular fitness activities had stronger Abdominal muscles as measured by vaginal squeeze pressure than those leading more sedentary.
20. **Liz Joyce** and **Jolene Murdoch** found that exercising too strongly or in an incorrect way can further increase the diastasis recti. So the exercises should perform in proper way and gently.
21. **Shelby Scott** – the prevalence of diastasis recti abdomini in postpartum period. 53% of woman develops diastasis recti in immediate postpartum period. 36% of woman develops diastasis recti develop after 2 months of postpartum period. She is suggesting abdominal strengthening exercises to minimize the diastasis recti in postpartum period.

III. METHODOLOGY

Research Design

The study is experimental in nature. 20 samples are taken. Pretest measurement is taken for abdominal muscle strength using dynamic abdominal endurance scale. After which the abdominal strengthening exercise was given to the patient. After that posttest measurement is taken in a similar fashion in a set of pretest measurement.

Experimental group



Setting of the Study

The study was conducted in postnatal wards in PARKKAVAN HOSPITAL, TRICHY.

Population Sample

The samples that fulfill the selection criteria were the population for the study.

Sampling Method

Purposive sampling method was done in post natal wards.

Criteria for Selection

1. Mothers who are willing to participate.
2. Mothers who had normal delivery with no other medical complications.

Inclusion Criteria

1. Mothers of age between 20- 30 yrs.
2. Normal delivery mother's
3. Working mother's

Exclusion Criteria

1. Mother's above the age of 30 yrs.
2. Mother's with Caesarian section
3. Mother's with severe postnatal problems
4. House wives

Testing Tool

Dynamic Abdominal Endurance Test

This assessment is used for testing the endurance of the abdominals of the working mothers.

Scoring Procedure

Dynamic Abdominal Endurance Test

Normal (5)	-	hands behind neck until Scapular clear the table. (20-30) Seconds hold)
Good (4)	-	arms cross over chest until scapular clear the table (15-20) second hold)
Fair (3)	-	arm straight until scapular clear the table (10-15 sec hold)
Poor (2)	-	arms extended towards knees, until top of scapular lift from table. (5-10 sec hold)
Trace (1)	-	Unable to raise more than head off table

Observation Checklist

This assessment test was used to evaluate the abdominal strength of the postnatal working mothers.

Data Collection Procedure

Pilot study was done. The study was conducted by fixing validity and reliability criteria. It was conducted in 3 phases

The Study was done in three Phases:

I phase

- A preliminary class had been conducted about abdominal muscle strength and uses of the muscles for the working woman.
- The strength of the abdominal muscle is evaluated on the first day of abdominal strengthening training program.
- They were explained about the study protocol before their written consent was got.
- Then the testing tool is selected and given instructions about the experimental tools.
- Then they were scored for their level of abdominal muscle strength (pretest).

II phase

- Selected subjects participated in 45 minutes lecture with demonstration session about the abdominal muscle strengthening exercise program.
- They were motivated to follow the exercise program of 30-40 minutes session for at least 3 days per week regularly.

III phase

- Cool down and relaxation techniques.

Treatment protocol

Exercise program

Duration	Activity
10 minutes	warm up exercise
15 minutes	abdominal strengthening exercise program
5 minutes	cool down exercise
10 minutes	relaxation techniques

Benefits of exercise program

- Increase the strength of the abdominal muscles
- Enhance the development of body awareness
- Enhanced physical fitness
- Enhanced ability to learn and perform skilled movements

First Phase

Pretest was conducted for all the 20 participants with dynamic abdominal endurance test.

Second Phase

Abdominal strengthening programme was given to the experimental group of working woman following normal delivery. 20 – 30 minutes was allotted for each session.

ABDOMINAL STRENGTHENING EXERCISE PROGRAM

Definition

It refers to well-planned instructions module on selected aspects of abdominal strengthening exercise.

Aim

The aim of the physiotherapist is to help the mothers to adjust physically and emotionally in the postnatal period.

Uses and Effects of Abdominal Strengthening Exercises

- ❄ Relieve discomforts and relieve the stress
- ❄ Reinforces relaxation to back and abdominal muscles
- ❄ Improve posture and appearance
- ❄ Maintain the pelvis in proper position and protecting the abdomen muscles and pelvic floor muscles from undue stretching and possible separation.
- ❄ Exercise will help to recover postpartum, increase energy level
- ❄ Exercises keep the abdominal muscles strengthen.

Class Structure

- ❄ Encourage fluid intake
- ❄ Emphasis safety and correct posture
- ❄ Warm up 3 minutes
- ❄ Gentle cool down 3 minutes
- ❄ Specific strengthening, stretching and balancing work.
- ❄ Changes checked every end of the week.

Warning Signs and Symptoms

- ❄ Shortness of breathe
- ❄ Pain
- ❄ Dizziness
- ❄ Faintness
- ❄ Vaginal fluid loss
- ❄ Heavy bleeding
- ❄ Urine leakage

Guidelines for women during postnatal period

- ❄ Ensure adequate warm up and cool periods
- ❄ Exercise regularly 3 times per week
- ❄ Maintain correct posture and keep your back straight
- ❄ Avoid vigorous bouncing
- ❄ Wear comfortable clothes during exercises
- ❄ Do not over exert and avoid exercising in hot conditions
- ❄ Avoid lifting weights
- ❄ Exercise should not exceed 20 minutes.
- ❄ The exercise session should feel good and enhance your feelings of well being
- ❄ Eat at regular intervals and include healthy snacks.
- ❄ Drink lots of water before, during and after exercise.

Warm up Exercises

- ✦ Subject walking 5 minutes before each session.
- ✦ Stretching for all the neck, upper & lower extremities muscle group.

- ✦ Stretching (with caution) for all the neck upper and lower extremities muscle group. Hip abductors & knee flexors muscle group must not be overstretched in case of women with pelvic liabilities.
- ✦ Corrective neck muscle exercises

Subject sitting position, gentle passive cervical traction/ active cervical movements lutenupt prolonged static holding in flexion rotation, posture correction, chin retraction, cervical extension.

Rules for self-stretching

- Relax during the stretch
- Focus on the muscles and joints being stretched
- Feel the stretch
- No bounce during the stretch
- Alternate the stretch to allow for proper rest period
- Do not stretch the hold muscles
- Breathe slowly and rhythmically and don't hold your breath
- Take your time

Pull Head to one side

- Facing forward, tilt your head so your ear is closer to one shoulder.
- Your shoulder should be relaxed and dropped slightly.
- Try holding for 30 seconds.
- Drop head forward slightly so you are looking downward, still tilted to the side.
- For a stronger stretch, let the opposite arm (if tilting to left, use right arm) hang by your side and
- Reach toward the ground.
- Repeat 2-3 times on each side.

Bring your Head forward

- Drop your head to one shoulder and roll head forward slowly from one shoulder to the other.
- Roll only to the front and sides. Do not roll your head backwards.
- Repeat 10 times.

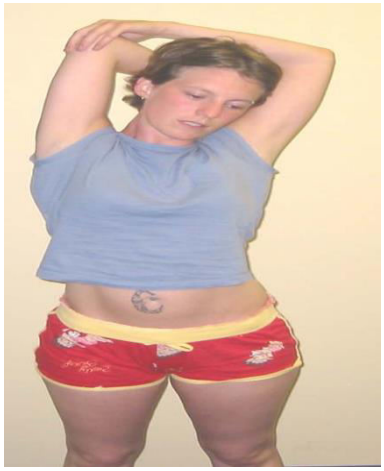
Shoulder shrugging

- Slowly shrug shoulders in an upward, then downward motion.
- Repeat Alternative
    - Shrug upward slowly while taking a deep breath in
    - Shrug downward quickly, while exhaling forcefully.
- Repeat 10 times.

Biceps Stretching

- In a seated or standing position, place your arm straight in front of you with your palm facing down.
- With your hand slightly below shoulder level, slowly swing your arm to the side.
- Your head and body should still be facing forward.
- Swing arm further back and raise your hand as if you were telling someone behind you to stop Hold.
- Listen to your body to know what an appropriate hold time is for you. Try working up to a 30-60 second holds.
- Repeat 3 times

Triceps Stretching



- In a seated or standing position bring one arm up in front of you and up over your head.
- Bend at the elbow, as if you are patting yourself on the back.
- Hold. Listen to your body to know what an appropriate hold time is for you. Try working up to a 30-60 second holds.
- Repeat 3 times.

Quadriceps Stretching

- In a standing position, hold on to a wall for support.
- Grab one leg at the shin and bring it up so that your foot is near your buttocks.
- Stand straight, and bring the knee of the bent leg back so that you feel the stretch in your upper leg.
- Hold. Work your way up to a 60-second hold.
- Change sides.
- Repeat 3 times each side.

Hamstrings Stretching

- Sitting tall in a chair, extend one leg straight out in front of you.
- Drop the extended leg so that the heel is resting on the floor; your extended leg should be straight,
- So move forward on the chair if you need to.
- Point your toe toward your face.
- Relax your arms at your sides and slowly hinge or bend forward at your hips.
- Stop when you feel a comfortable stretch.
- Hold. Gradually work your way up to a 60-second hold.
- Repeat with the other leg.
- Repeat 3 times for each leg.

Abdominal strengthening exercise

A. Abdominal Crunch

Starting position: - supine lying

Procedure

- Lie on your back with your knee bent, feet on the floor and ankles pressing down on the floor.
- Hold your hands behind your head and then raise your head.
- As you contract your stomach muscles, breath properly and work up to 10 repetitions.

B.Floor Crunch

Starting position: - supine lying

Procedure

- Lie flat on your back on the floor legs bent, feet flat, push lower back into the floor.
- Claps your hands behind your neck, keeping your elbows back, in line with your head.
- Crunch up slightly, raising your head and shoulders, breathing out as crunch.
- As you crunch up push your lower back into the floor and squeeze your tummy as tight as possible.
- Lower your head and shoulders back down to the floor and repeat as you should feel a burning sensation in your upper tummy area and midsection.

C. Side Crunch

Starting position: - supine lying

Procedure

- Lie flat on your back on the floor, have your knees bent and legs pointed to one side.
- Your lower body should be pointing to the side but your upper body should remain straight and flat on the floor.
- Have your hands by the sides of your head and your elbows back.
- Crunch up slightly pushing your lower back into the floor, raising your head and shoulders, squeezing the side of your waist.

- ✦ Lower your head and shoulders back down to the floor.
- ✦ Repeat the exercise until you have finished your repetitions and then change to the other side.

D. Lower Abdominal Crunch

Starting position: - supine lying

Procedure

- ✦ Lie flat on your back on the floor, legs raised, knees bent and lower legs folded.

- Push your lower back into the floor.
- Place your hands by your sides, palms facing the floor.
- Raise your backside and hips slightly, breathing out at the same time.
- As you crunch up push your lower back into the floor and squeeze the lower section of your tummy (pelvis region) as tight as possible.
- Lower your hips and backside back down to the floor and repeat. You should feel a burning sensation in your lower tummy area and upper pelvis.

E. Pelvic Tilt

Starting position: - supine lying

Procedure

- Lie on your back, knee bent up and feet flat on the floor.
- Place hands on your stomach so that you can feel the tightening muscles.
- Gently tighten your stomach muscles and push the arch of your back towards the floor.
- Squeeze your bottom tight.
- Hold the position till the count of 6 and then relax.

F. Bicycling maneuver

Starting position: - supine lying

Procedure

- Lie on your back and keep your lower back on the floor.
- Now tighten your stomach muscles and alternatively kick your legs out in front of you.
- Repeat 10 times on each leg.

G. All Four- Leg Raising

Starting position: - Quadripod

Procedure

Subject on hands and knees instructed to first do a posterior pelvic tilt then slowly lift one leg extending the hip to level no higher than the spine while keeping back straight. She then slowly lowers the leg and repeats on with opposite side. The knee may be remains flexed or can be straightened throughout the exercises.

H. Straight Leg Raising

Starting position: - supine lying

Procedure

Lying on your back, toes pointed and knees straight, raise one leg and then the other as possible using your abdominal muscles but not your hands to lower your legs slowly. Relax completely and repeat up to 15-20 times.

I. Abdominal Tightener

Starting position: - supine lying

Procedure

- Lie on the floor, knees bent and arms resting on your thighs.
- Lift up slowly, sliding your hands up your thighs towards your knees.
- Breathe out as you lift up. Work up to at least 12 repetitions.

J. Side kick

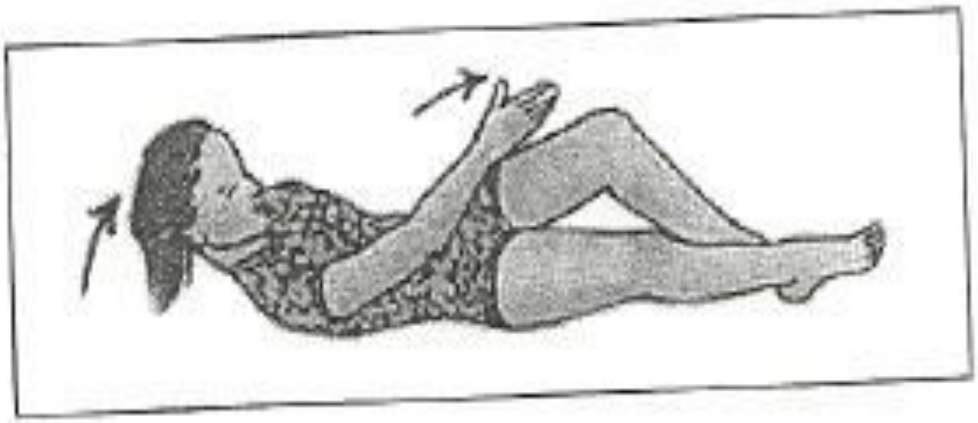
Starting position: - side lying

Procedure

Lie on your side with the head resting on your arm, bottom leg slightly bend keeping abdomen tight to hold your torso steady exhale and extend the top leg forward until your knee and foot are in line with your hip.

Go back to the starting position and repeat 10-15 times before switching sides. Make sure you maintain neutral position of the leg moves forward.

K. Elbow to Knee lifts



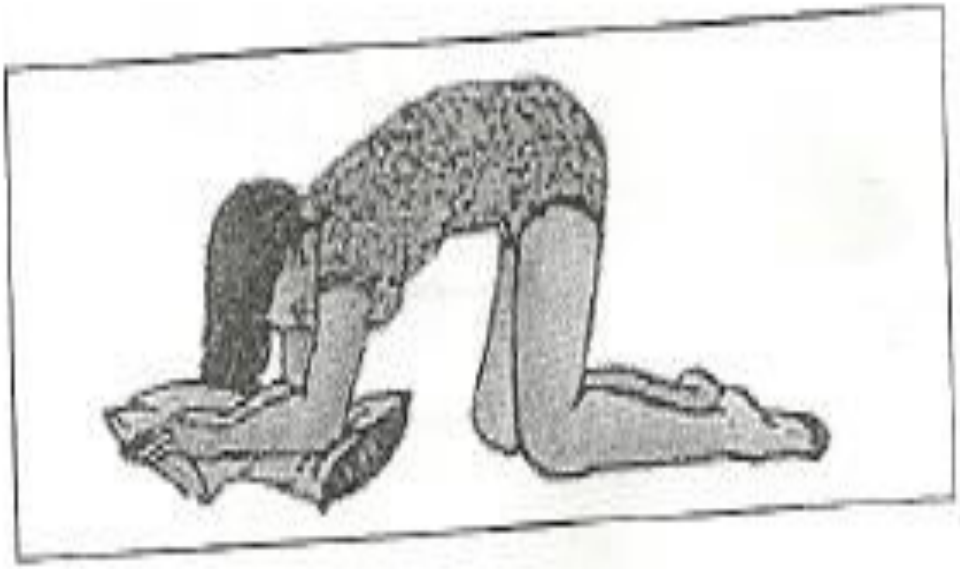
Starting position: - supine lying

Procedure

Gently bring one knee and your opposite elbow together.

- Then bring your other elbow and knee together. Work up to 20 repetitions on alternating sides.

L. Abdominal Hollowing



Starting position: - prone lying

Procedure

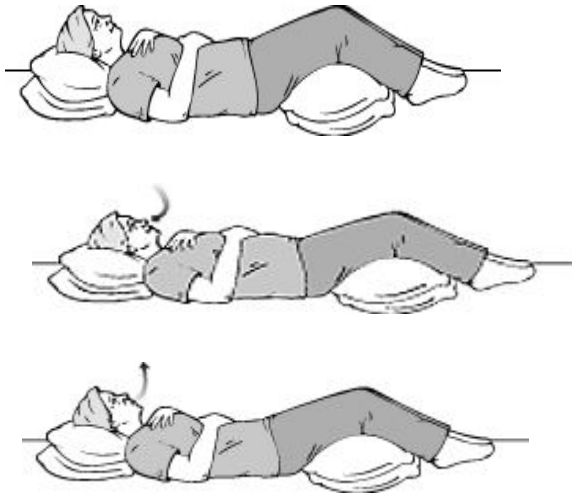
Leaning on your elbows and knees, keep forearms and lower legs together. Hump your back upwards, strongly contracting your buttocks and drawing in your abdomen. Then relax and breathe deeply.

Cool Down Exercises

Repeat the initial stretching exercise for 3-5 repetition.

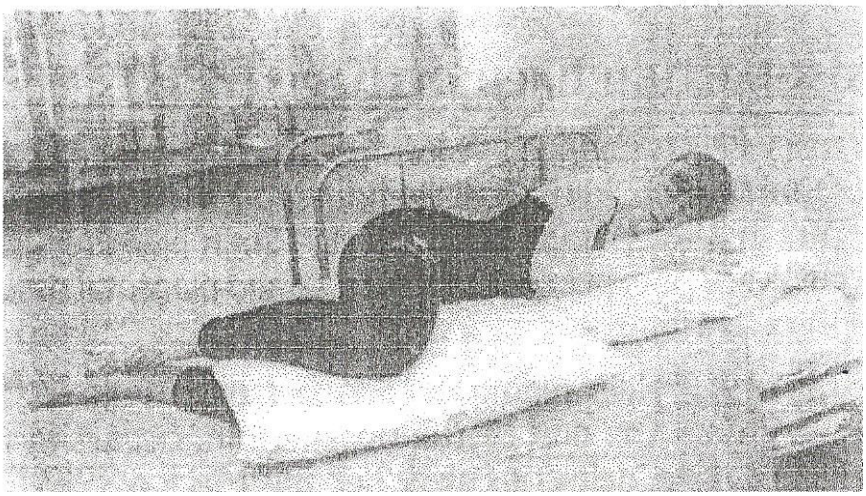
Stretching for all the neck, upper and lower extremity muscle groups

Diaphragmatic Breathing Exercises



Subject was in supine lying, place her own hand on just below the anterior costal margin, ask the subject to breath in slowly and deeply through the nose. Then slowly the air out using controlled expiration and feel the movement by his hand. Have the subject practice this three (or) four times and then rest.

Relaxation



Mental imagery and muscle setting: Subject was in supine lying verbal guidance given by the therapist. Concentrate on a relaxing mental image and muscle setting. Deep slow relaxed breathing to the routine.

Third Phase

Posttest was conducted with the same testing tool after the abdominal strengthening exercise program.

DATA ANALYSIS

Statistical method used in this study was frequency, percentage, distribution, mean, standard deviation, paired‘t’ test.

Statistical Analysis

Resultant or paired‘t’ test was used to compare the pretest and posttest scores.

Formula used

$$\text{Mean } X = \frac{\Sigma x}{N}$$

X = Individual value

Σx = Sum of Individual value

N = Total number of samples

Standard Deviation (S) =

$$\sqrt{\frac{\Sigma x^2}{N} - \left(\frac{\Sigma x}{N}\right)^2}$$

X = Individual value

X = Mean of the Individual values

N = Total number of samples

Standard Error (SE) = $\frac{S}{\sqrt{n}}$

paired‘t’ test

$$t = \frac{\overline{d}}{\frac{S}{\sqrt{n}}}$$

$\overline{d}$ = Mean of the deviation

n = Total number of sample

S = Standard deviation

Table 1

PRETEST & POSTTEST TABLE

Dynamic abdominal endurance test

S.No.	Age	Pretest	Posttest
1.	25	3	5
2.	24	1	4
3.	27	2	4
4.	29	1	3
5.	28	2	4
6.	29	1	3
7.	26	2	4
8.	25	2	5
9.	25	1	4
10.	29	1	2
11.	27	2	3
12.	24	2	4
13.	26	2	4
14.	26	1	3
15.	22	3	5
16.	26	2	4
17.	23	1	4
18.	25	3	5
19.	29	1	3
20.	28	2	4

Figure 1

Graphical representation for pretest & posttest score among participants

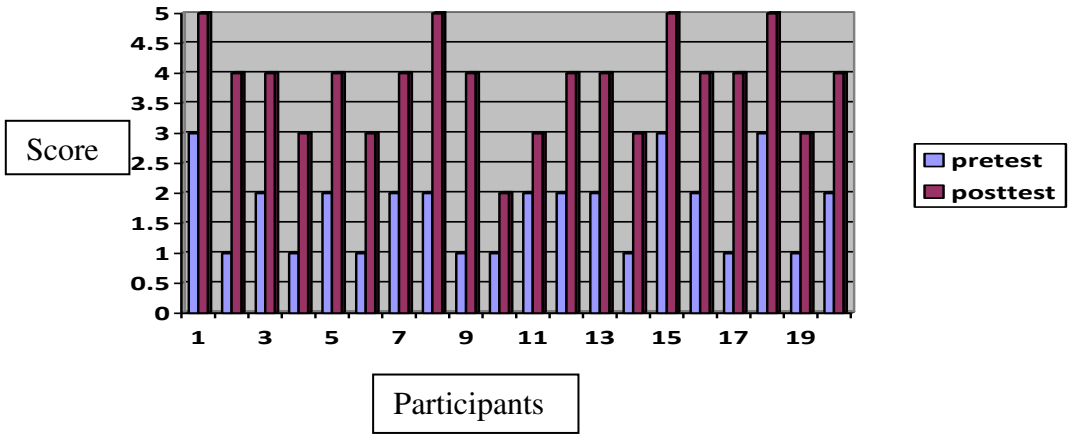


Table 2

MEAN & STANDARD DEVIATION FOR DYNAMIC ABDOMINAL ENDURANCE TEST SCORE

	Pretest	Posttest
Mean	**1.75**	**3.85**
S.D.	**0.6982**	**0.7921**

Figure 2

GRAPHICAL REPRESENTATION
MEAN DIFFERENCE
PRETEST vs. POSTTEST

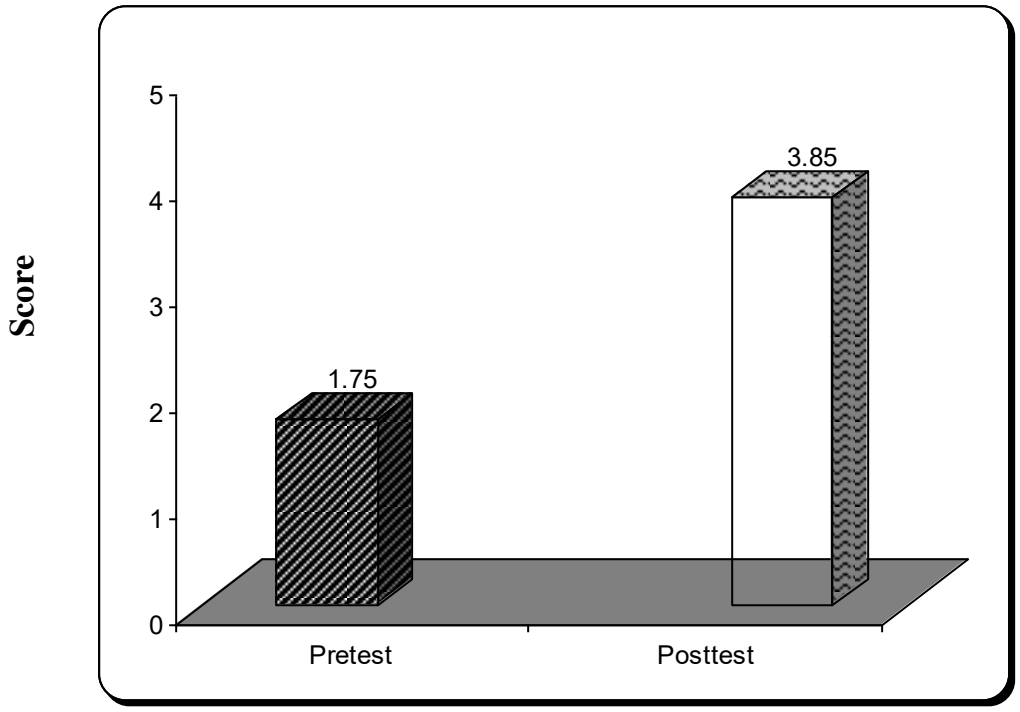


Table 3

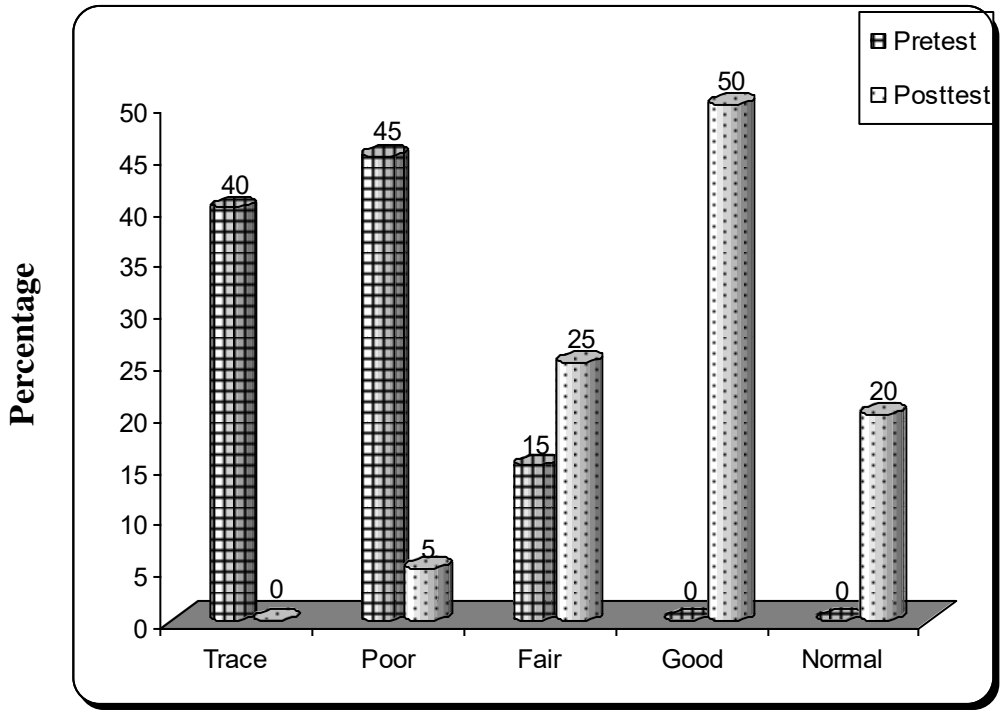
NUMBER OF WORKING WOMAN VS DYNAMIC ABDOMINAL ENDURANCE TEST SCORE IN %

Dynamic Abdominal endurance Test	Pretest		Posttest	
Score	**f**	**%**	**f**	**%**
Trace	8	40	--	--
Poor	9	45	1	5
Fair	3	15	5	25
Good	--	--	10	50
Normal	--	--	4	20

Table shows the population distribution percentage of pre and posttest score. In pretest showed trace score 40%, poor score 45%, fair score 15%. In posttest showed poor score 5%, fair score 25%, good score 50%, normal score 20%. The above results are presented graphically in figure 1.

Figure 3

GRAPHICAL REPRESENTATION NUMBER OF WORKING WOMAN VS DYNAMIC ABDOMINAL ENDURANCE TEST SCORE IN %



Abdominal Endurance Test

Table 4

TEST STATISTICS FOR DYNAMIC ABDOMINAL ENDURANCE TEST SCORE

Calculated 't' value	**17.44**
Table value at 0.05%	**2.093**

Discussion

The necessary tabulation and their graphical representation for the study have been presented. Based on the recorded value the statistical analysis has been carried out and presented for interpretation.

Table 1 presents the sample number, age and pretest & posttest values for dynamic abdominal endurance test. It was shown in figure 1.

Table 2 shows mean and standard deviation of pretest & posttest for dynamic abdominal endurance test. Mean value was shown in figure 2.

Table 3 shows distribution of dynamic abdominal endurance test of pretest & posttest. In pretest, number of participants having trace 8(40%), poor 9(45%), fair 3(15%) and good & normal are 0. In posttest, the participants having trace 0(0%), poor 1(5%), fair 5(25%), good 10(50%) and normal 4(20%). These results are graphically represented in figure 3.

Table 4 shows the calculated t value 17.44 and table value at 5% is 2.093.

Results

This study presented the assessment of effectiveness of abdominal strengthening exercise program for 20 study samples of working woman following normal delivery.

Among the selected participants most of them found weak abdominal muscles. Abdominal strengthening program was given to the participants.

The study carried out had a correlation with the literature review. The statistical interpretation of the Mean and Standard Deviation shows the improvement in abdominal muscle strength. Test statistics for strength calculated has been compared with tabulated T-test values. It is found that the calculated test statistics (17.44) from the recorded values is higher than the tabulated value (2.093). So we rejected the null hypothesis and accept the hypothesis, saying that there is significant improvement in strength following strengthening exercise program for working woman following normal delivery.

Conclusion

The statistical analysis done from the pretest and posttest values of abdominal endurance test score showed that abdominal strengthening exercise program had a significant effect in improving the abdominal muscle strength for working woman following normal delivery.

Suggestions

This opportunity develops both specific and health care awareness. Further study can be used to assess the programme for caesarian postnatal mothers for other group primi or multi gravida mothers.

A similar study on a large sample may help to draw more definite conclusion and make generalization.

BIBLIOGRAPHY

1. British Journal of Obstetrics & Gynecology :91:1091-1095 (1984)
2. Carolyn M.Hicks. Research for PT. Churchill Livingstone (1988)
3. Llewellyn- Jones. D; Fundamentals of Obstetrics & Gynecology 4th edition, Volume II(1986)
4. Margaret Polden & Jill Mantle Obstetrics & Gynecology for PT,9th edition, Churchill Livingstone (1990)
5. Sunder Rao: P.S,S. Richard: An Introduction to Biostatics, Prentice Hall of India (1998)
6. Sapsford,R., Bullock-Saxton, J.Markwell,S; Women's Health; A.T.B. for physical therapists, W. B. Saunders,(1998)
7. The American College of Obstetrics & Gynecology (2002)
8. Williams H; Exercise & Pregnancy — Australian PT association Journal of National Women's Health Group (1991)
9. Tank, D.K. Usha. B, Sarautam Patel. MX. Shyam, V. Desai; Frontiers in Obstetrics & Gynecology, Jaypee, 2nd edition.
10. Valarie edge, Mmdi Miller; Woman's Health Care, Mosby's Clinical Nursing series.
11. William D MC. Ardle, Frank I Katch, Victor I Katch; Exercises, PT, 4th edition, Williams & Wildins.

12. John,W,W, Studd: Progress in Obstetrics & Gynecology, Vol: 15. Churchill Livingstone.

13. Padubidri; V. Shirish N. Dafirary, Shaws text book of Gynecology, Livingstone.

14. Rebecca 0. Stephens On, Linda, 1.0 Connor Obstetrics& Gynecology, Care in physical therapy, 2nd edition.

15. Lawrence. Irnpey; Obstetrics & Gynecology, Blackwell (1999)

16. Johnson. Johnson, Murray, Apgar, Women's Health Care Hand Book, 1st edition. Jaypec brothers, (1998)

17. Li. Kate Copeland; Women's Health and PT.

18. Deitra Donard Lowdermilk, Shannon B. Perry; 8th edition; Maternity & Women's Health Care. Mosby, (2004)

19. CHASE. JDOLMAN, (1996) Comparison between the health belief Model & subjective expected utility theory predicting Incontinence prevention behaviors in postpartum women C American Journal of Obstetrics & Gynecology" Vol.2.

20. Charles. LB. Beckmann, (1991) Obstetrics & Gynecology. Churchill Livingstone.

21. Zoe Meachian Dip; phy, women health, A text book for PT, 1st edition (Harcourt Brace and Company Asia. he Ltd).

APPENDIX – I

Post natal assessment Chart

Name of the mother: date:

Age:

Address:

Occupation:

Type of delivery:

Delivery summary

Date:

Time:

Complications:

Relevant medical history:

(Illness, operation)

Antenatal complications:

Previous level of activity:

Any musculoskeletal problems:

Review date:

Declaration

I am willing to participate in this dissertation work conducted at parkkavan hospital, trichy.

Signature of the physiotherapist signature of the patient

APPENDIX – II

SCORING PROCEDURE

Dynamic Abdominal Endurance list

Normal (5)	-	hands behind neck until Scapular clear the table. (20-30) Seconds hold)
Good (4)	-	arms cross over chest until scapular clear the table (15-20) second hold)
Fair (3)	-	arm straight until scapular clear the table (10-15 sec hold)
Poor (2)	-	arms extended towards knees, until top of scapular Lift from table. (5-10 sec hold)
Trace (1)	-	Unable to raise more than head off table